



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

10/540,061

02/22/2006

Hajime Harada

5404/111

1320

757 7590 02/14/2007  
BRINKS HOFER GILSON & LIONE  
P.O. BOX 10395  
CHICAGO, IL 60610

EXAMINER

REDDY, KARUNA P

ART UNIT

PAPER NUMBER

1713

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
--	-----------	---------------

3 MONTHS

02/14/2007

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

**Office Action Summary**

Application No.

10/540,061

Applicant(s)

HARADA ET AL.

Examiner

Karuna P. Reddy

Art Unit

1713

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-17 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-17 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date 6/22/2005, 7/24/2006.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_.
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_.

## DETAILED ACTION

### ***Claim Rejections - 35 USC § 102***

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1-17 are rejected under 35 U.S.C. 102(b) as being anticipated by Nakagawa et al (WO-99/43719 – *WIPO publication is used for date purposes and the English language equivalent US 6,964,999 B1 for column and line numbers of text*).

Nakagawa discloses a process of making vinyl polymer having at least one terminal (meth)acryloyl group of the general formula  $-\text{OC}(\text{O})\text{C}(\text{R})=\text{CH}_2$  per molecule (column 3, lines 51-55). The living radical polymerization process uses a radical scavenger such as nitroxide compound. For this polymerization reaction, a nitroxy free radical ( $=\text{N}-\text{O}^\bullet$ ) which is stable, is used as a radical capping agent (column 7, lines 30-41).

In the vinyl polymer with at least one terminal (meth)acryloyl group of the general formula  $-\text{OC}(\text{O})\text{C}(\text{R})=\text{CH}_2$  per molecule, R represents H or an organic group containing 1 to 20 carbon atoms (column 3, lines 51-58). More preferably are  $-\text{H}$  and  $-\text{CH}_3$  (column 4, lines 18-24). Examples of monomers to form the main chain of vinyl polymer include (meth)acrylic monomers, styrene monomers (column 4, lines 34, 57). Styrene and (meth)acrylic monomers are preferred.

Art Unit: 1713

More preferred are acrylic ester and (meth)acrylic ester monomers (column 5, lines 13-15). The polymer is prepared by living radical polymerization or by radical polymerization using a chain transfer agent (column 5, lines 4-46). The atom transfer radical polymerization is a still more preferred mode of living radical polymerization (column 8, lines 38-40). The transition metal complex for use in the atom transfer radical polymerization includes a metal complex the central metal of which is selected from among the elements belonging to group 7, 8, 9, 10 or 11. More preferably the central metal of the transition metal complex is zero-valent copper, monovalent copper, divalent ruthenium, divalent iron and divalent nickel. Copper complexes are especially preferred (column 14, lines 50-58).

The vinyl polymer is obtained by reacting an olefin polymer having a terminal structure of the general formula  $-CR^1R^2X$  (wherein  $R^1$  and  $R^2$  represent a group attached to the ethylenically unsaturated group of a vinyl monomer and X represents chloro, bromo or iodo) and with a compound represented by  $M^+OC(O)C(R)=CH_2$  (wherein R represents hydrogen or an organic group of 1 to 20 carbon atoms and  $M^+$  represents an alkali metal or quaternary ammonium ion) (column 15, lines 35-50).

The vinyl polymer is obtained by reacting a hydroxy terminated vinyl polymer with a compound represented by  $XC(O)C(R)=CH_2$  (wherein R represents H or an organic group of 1 to 20 carbon atoms and X represents chloro, bromo, or a hydroxyl group) (column 15, lines 51-57).

Art Unit: 1713

The vinyl polymer is obtained by reacting a hydroxy-terminated vinyl polymer with a diisocyanate compound and the residual isocyanate group is reacted with a compound represented by  $\text{HO-R}'\text{-OC(O)C(R)=CH}_2$  (wherein R represents hydrogen or an organic group having 1 to 20 carbon atoms and R' represents a bivalent organic group of 2 to 20 carbon atoms) (column 15, lines 58-67).

The number average molecular weight of the vinyl polymer is preferably 500 to 100000 (column 5, lines 32-34). The vinyl polymer preferably has a molecular weight distribution i.e. the ratio of weight average molecular weight to number average molecular weight of less than 1.8 (column 5, lines 20-23).

Therefore, Nakagawa et al anticipates the instant invention.

3. Claims 1-11 and 16-17 are rejected under 35 U.S.C. 102(b) as being anticipated by Nakagawa (EP 1 000 954 A1).

Nakagawa discloses a process for making a stellar polymer which comprises polymerizing a vinyl monomer in the manner of living polymerization and adding a compound having two or more polymerizable carbon-carbon double bonds at the end point of polymerization (abstract). In this polymerization a nitroxy free radical ( $=\text{N-O}^{\cdot}$ ) which is generally stable is used as the radical capping agent (paragraph 0016).

The compound having two or more polymerizable  $\text{C}=\text{C}$  bond includes

Art Unit: 1713

$-\text{OC}(\text{O})\text{C}(\text{R}^6)=\text{CH}_2$  (wherein  $\text{R}^6$  is H, Me, CN or a group selected from among organic groups containing 1 to 20 carbon atoms (paragraph 0012, page 4, lines 15-24).

Vinyl monomers to be used include (meth)acrylic acid monomers, styrene monomers (paragraph 0043). Most preferred are acrylate ester monomers and methacrylate ester monomers (paragraph 0044).

In the present invention, atom transfer polymerization is preferred (paragraph 0016). The transition metal complex to be used as catalyst in the atom transfer radical polymerization include complexes of Cu(0), Cu(I), Ru(II), Fe(II) or Ni(II) (paragraph 0024).

The polymer has a narrow molecular weight distribution, namely narrow ( $M_w/M_n$ ) ratio and preferably not more than 1.8 (paragraph 0056).

See examples 1-3 where in the molecular weight of stellar polymer is greater than 2000.

Therefore, Nakagawa anticipates the instant claims 1-11 and 16-17.

### ***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:
1. Determining the scope and contents of the prior art.
  2. Ascertaining the differences between the prior art and the claims at issue.
  3. Resolving the level of ordinary skill in the pertinent art.
  4. Considering objective evidence present in the application indicating obviousness or nonobviousness.
6. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Nakagawa (EP 1 000 954 A1) in view of Nakagawa et al (WO-99/43719 – *WIPO publication is used for date purposes and the English language equivalent US 6,964,999 B1 for column and line numbers of text*).

The discussion with respect to Nakagawa in paragraph 3 is incorporated herein by reference.

The prior art of Nakagawa is silent with respect to the use of chain transfer agent during radical polymerization.

However, Nakagawa et al has shown that vinyl polymers can be produced by radical polymerization using a chain transfer agent (column 5, 44-46). In the chain transfer method, polymerization reaction is conducted using a chain transfer agent having a defined functional group to give a vinyl polymer having the functional group (column 6, lines 7). Therefore, it would have been obvious to one skilled in the art at the time invention was made to polymerize vinyl monomer using chain transfer agent because Nakagawa et al have proven

Art Unit: 1713

successfully the polymerization of vinyl monomer using a chain transfer agent and one of ordinary skill in the art would have expected the process to work for the polymerization of vinyl monomer of Nakagawa, motivated by expectation of success.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Karuna P. Reddy whose telephone number is (571) 272-6566.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Wu can be reached on (571) 272-1114. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service



Art Unit: 1713

Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Karuna P Reddy  
Examiner  
Art Unit 1713



DAVID W. WU  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 1700